the hour had struck many homes were destroyed. The storm was introduced by a very sudden downfall of torrents of rain that was described as like the bursting of a waterspout, or like a cloudburst. * * * The rain lasted for a few minutes followed by a lull, and then, with a bang and a howl, came the wind. * * * The greatest width of the tornado's direct influence was about a hundred and fifty yards. Buildings were razed to the ground, others were unroofed and others collapsed. The wind cut a lane for itself, with very clearly marked edges. A stately palm tree still stands, with all the branches on one side ripped off, but the other side untouched. Sergeant Brennan, of the North Sydney police, watched the wind sweep one side of his house, while on the other side there was no disturbance. * * * Leslie's house was lifted up and carried along bodily, until it was crushed against some large trees. Mr. Wilson, in speaking of Kemsley's cottage, says "that it rose quite steadily, as if something was underneath, raising it up, and then came down almost as gently, like a parachute; then it was moved horizontally about five feet." At Windgrove's cottage a sheet of iron was taken out of the roof, almost straight up in the air, and caught in the limbs of a tree; then the wind destroyed the cottage. Another house was lifted up bodily into the air, like a box kite, and collapsed while in the air. The tornado passed on, across Lavender Bay and over the Botanic Garden.

Mr. Hunt states that this storm should not be called a hurricane or a cyclone, but a tornado, or destructive local whirlwind. Many similar tornadoes are on record in New South Wales, such as that at Pyrmont, in 1890 or 1891; Leichhardt and West Balmain, in 1889; at Wyalong in 1893; at Pirillie in 1895; and at Mudgee and Nevertire in December, 1896; at Narrabri in January, 1902; at Berrigan and Deniliquin in 1901; at Bourke in 1894, and at Cootamundra in April, 1903.

C. A.

CHANGE OF TITLE AND ADDRESS.

The Director of the Astro-Meteorological Observatory in Trieste, (Prof. Dr. Edward Mazelle) announces that this institution has been transferred to the Minister of Commerce, and its future title and address will be:

K. k. Maritimes Observatorium, Trieste, Austria.

METEOROLOGICAL INSTITUTE OF SAXONY.

Prof. Dr. Paul Schreiber, Director of the Royal Meteorological Institute, Saxony, whose central office has for many years been located at Chemnitz, announces that the office of the Institute has been transferred from Chemnitz to Dresden. The mail address will be: Dresden, Neustadt, Grosse Meissner Strasse 15, for the official mail; but Professor Schreiber's personal address will be simply Dresden, N. 6.

The Meteorological Institute of Saxony conducts its own daily weather forecasts, and maintains one central station of the first order, fifteen stations of the second order, six of the third order, 150 of the fourth order, 600 stations for the measurement of depth of snow, and 4000 stations for the reports of hail and thunderstorms. It quite recently employed two scientific assistants, four clerks, one mechanic, one lithographer, and twelve computers. The annual allowance is about twelve thousand dollars, which is exclusive of the salary of the director.—*C. A.*

MONTHLY REVIEW OF THE PROGRESS OF CLIMATOLOGY THROUGHOUT THE WORLD.

By C. FITZHUGH TALMAN, U. S. Weather Bureau.

CLIMATOLOGY OF THE NILE VALLEY.

In 1893 Sir W. Willcocks wrote:

As Egypt possesses no barometric, thermometric, or rain-gage stations in the valley of the Nile, we are always ignorant of the coming flood.

In his "Rains of the Nile basin in 1904" (Cairo, 1905), Capt. H. G. Lyons says:

Five years ago there were not more than six or eight places in the Nile basin where the rainfall was being measured regularly, while to-day there are more than forty, of which thirty-two lie to the south of Berber (latitude 18° north). The parts played by the different tributaries of the Nile have also been determined during the last few years so that we are now able to recognize, with very fair accuracy, the share which the rainfall of the different districts takes in supplying the Nile, and to trace the effects of excessive or deficient rainfall in any area.

Captain Lyons does not think it necessary to add that the immense progress recently made in the hydrological investigation of the Nile Valley is largely the fruit of his own efforts. In his "Rains of the Nile basin in 1905,"[1] just issued, we have the latest statistics regarding the distribution of rainfall stations in this region. Sixty-four of these are now in operation, of which 31 are in Egypt and the Sudan, the remainder being situated in the neighboring territories of Eritrea, Uganda, British East Africa, German East Africa, and British Central Africa. Besides these stations where the rainfall is regularly measured there are 44 stations which record the number of rainy days.

While the rainfall has been the chief subject of enquiry in northeastern Africa, the investigation of the other elements of climate has gone forward apace in this region during the past few years, as is fully attested by the wealth of meteorological data cited in Captain Lyons's beautiful monograph on the physiography of the Nile and its basin,[2] just published by the Egyptian Government. Most significant is the progress that is being made in the observation of atmospheric pressure. The leveling operations carried out by the Sudan Irrigation Service during 1905 have enabled the altitudes of the stations south of Khartum to be determined with considerable accuracy, so that it is now possible to reduce to sea level the observations of pressure made at many inland stations. New charts of pressure distribution have been drawn, which show clearly the very pronounced trend of the isobars from north to south along the Nile Valley, instead of in a westerly direction as far as the west coast of Africa, as was assumed when the only observations available were those of coast stations.

It has now been known for some years that the Nile flood is a faithful index of the rainfall of Abyssinia; since the volume of the White Nile is held back by the Blue Nile when in flood and the supply it furnishes is practically negligible during the flood season. The Abyssinian rainfall, in its turn, is a manifestation of the intensity and direction of the east African monsoon current, and therefore of the pressure conditions in this vicinity. The author adduces much evidence to prove that atmospheric pressure in northeastern Africa varies inversely as the rainfall of Abyssinia. A similar relation between pressure and rainfall has been demonstrated in other parts of the globe. Until recently, however, few pressure observations were available within the Nile basin; such outlying stations as Aden, Cairo, Alexandria, and Beirut have been used for purposes of comparison with the Nile flood.[3] In the present work the author is able to present provisional isobars for the summer months, for the whole of northeastern Africa, in the construction of which he has utilized observations from several new stations in the interior; while for the month of July he extends his isobars over the whole of northern Africa, with results differing markedly from all previous charts. A center of low pressure is conjectured to exist at this season between Lake Chad and Timbuctu. It is to be hoped that some of the French and British residents of this region will soon undertake regular observations of pressure, so that we may have positive information as to the existence or nonexistence of such a depression.

CYCLONIC WEATHER TYPES.

The last few years have been fruitful in suggestions looking to an improvement in the methods of presenting the statistics of climate. The demands made upon climatology are many and diverse; and it is probable that the climate of no place or region has ever been so fully portrayed as to satisfy all of

[1] Lyons, H. G. The rains of the Nile basin in 1905. Cairo, 1906.

[2] Lyons, H. G. The physiography of the river Nile and its basin. Cairo, 1906.

[3] Cf. On the relation between variations of atmospheric pressure in northeast Africa and the Nile flood, Proc. Roy. Soc., vol. A76, 1905, pp. 66–86.

them. It is notably true that the ordinary climatic tables often give a very imperfect idea of many of the features of a climate which most impress themselves upon one's mind in the course of actual experience of the climate in question. A recent paper by Prof. R. DeC. Ward, entitled "Suggestions concerning a more rational treatment of climatology,"[4] reenforces the recommendation of others that the cyclonic control of the weather be more fully exhibited in climatological statistics. The following extracts indicate the line of argument pursued in this paper:

> In the past, climatology has been too much concerned with averages and too little concerned with the units, i. e., the individual weather changes which go to make up the average. These changes, being actually experienced from day to day, and affecting man's activities, his crops, his health, his mode of life, are of the greatest interest and importance to him.
>
> Regular diurnal changes are very frequently overshadowed by the larger irregular changes which are due to the passage of cyclones and anticyclones. The essence of the cyclonic control being its irregularity, it is obvious that the cyclonic effects must very largely disappear when the usual time units are taken as the basis for averaging climatic data. Thus, the usual means, the ranges, the extremes, for a day, a month, a year, can not adequately emphasize the irregular cyclonic changes in the different elements, and yet these very changes are of the greatest importance in their effects on man, and really give a climate its character.

In other words, typical weather is as worthy of a place in climatological tables and descriptions as average weather. Professor Ward states that he is now engaged in making up diagrams illustrating weather types for various parts of the United States.

CLIMATE OF CENTRAL ASIA.

The climate of central Asia is still so little known that every scrap of meteorological information from that quarter is welcome. Even the hasty observations of travelers give us a valuable insight into some of the broader climatic features. It will be remembered that the British Mission to Lhasa, in 1903–4, dispelled the illusion that southern Tibet was an inhospitable frozen desert; the historians of the Mission paint alluring pictures of a rich agricultural country, which Colonel Waddell goes so far as to call "one of the most delightful residential places in the world."

Of the scientific results of Dr. Sven Hedin's journey of 1899–1902 to western and central Tibet and the adjacent regions to the north, the first section of the part devoted to meteorology has recently appeared,[5] and contains all the meteorological observations made during this journey, together with those made during Doctor Hedin's journey of 1894–1897. Most of these observations are from regions for which absolutely no meteorological data were previously available. A second section will contain an account of the methods of observation and a general discussion of the results from a climatological point of view. Doctor Hedin expects that this discussion will throw light upon several phenomena connected with the meteorology of the earth's greatest continent, such as the violent and constant east-northeast winds that blow in spring in the Lop-nor region, and that have wrought such marked changes, within historic times, in the configuration of that country.

It is interesting to note that much important meteorological work was carried on by the expedition of the Imperial Russian Geographical Society to Mongolia and Kham, including over a year of observations at a fixed station in Ts'aidam, contemporaneously with part of the work of Doctor Hedin. A preliminary report on the results was given by A. Kaminski in his recent paper on "The climate of Ts'aidam."[6] As Ts'aidam borders on the region explored by Doctor Hedin, it would be a matter of the highest interest to coordinate the observations of the two expeditions, supplemented by the results obtained at the permanent stations in adjoining countries, such as Leh, in Ladak, and Kashgar, in East Turkestan.

STATIONS IN GERMAN EAST AFRICA.

A recent paper by Dr. P. Heidke,[7] besides communicating the results of observations at the climatological stations in German East Africa during the years 1899–1902, furnishes very full particulars regarding the history and topographical conditions of each station, exposure of instruments, methods of observation, etc. It is a pity that this kind of information is not more generally given in connection with the results of observations. The value of much climatological material is impaired by a lack of information regarding the conditions under which it was obtained.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

During the first seven days of May the barometer was low over the British Isles and the western Atlantic and high over the Azores. From the 9th to 16th a barometric depression covered Spain and Portugal, the barometer was high over the British Isles and the western Atlantic, and there was a gradual breaking up of the Azores area of high barometer. From the 18th to 21st the barometric depression that had covered southwestern Europe apparently moved northeastward over France and Germany, the barometer fell rapidly in the vicinity of the Azores, and a disturbance appeared south of the Florida Peninsula. From the 22d until the close of the month the pressure was generally low over the British coasts. Over the Azores the barometer continued low from the 19th to the 28th and reached a reported minimum of 29.50 inches, with a wind velocity of 48 miles an hour, on the 26th, after which the disturbance in that region appeared to move northeastward toward the British coasts. From the 22d to 25th a disturbance moved northward over the Florida Peninsula, and on the 27th and 28th a storm moved eastward off the middle Atlantic coast of the United States.

During the first half of the month, and from the 19th to 29th, the weather was cool in the United States, and heavy frost and temperature near the freezing point occurred in the Middle Atlantic States and the Ohio Valley on the morning of the 11th, and light frost in the upper Mississippi Valley and the Lake region and at points in the interior of the Middle Atlantic States on the 29th. From the 17th to 19th a warm wave swept the middle and northern districts east of the Rocky Mountains, attended by temperatures that rose to and slightly above 90° from the upper Mississippi Valley over the Ohio Valley and Middle Atlantic States on the 17th and 18th.

At the close of the second decade of the month dry weather had prevailed nearly two weeks from the Mississippi River over the Ohio Valley and the Middle and South Atlantic and east Gulf States. During this period precipitation had been in excess from the valley of the Red River of the North to the Pacific coast. During the third decade of the month the drought in the Middle, Eastern, and Southeastern States was broken by copious rains.

There were four well-defined storm periods in the United States. From the 1st to 5th low areas I, II, and V caused

[4] Report of the Eighth International Geographic Congress. Washington, 1905. Pp. 277–293.

[5] Hedin, Sven. Scientific results of a journey in central Asia, 1899–1902. Vol. 5, part 1, a. Meteorologie von Dr. Nils Ekholm. 1. Die Beobachtungen, 1894–1897 und 1899–1902. Stockholm, 1905.

[6] Report of the Eighth International Geographic Congress. Washington, 1905. Pp. 380–385.

[7] Heidke, P. Meteorologische Beobachtungen aus Deutsch-Ostafrika Mitteilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten. Bd. 19, Hft. 1, pp. 40–106.